

Magnesia (MgO).....	1.38
Phosphoric acid (P ₂ O ₅).....	.10
TiO ₂ and loss (by difference)15
Total.....	100.00

"The entire absence of potash and the presence of a small

amount of titanium prove conclusively that it is not dust of a local origin; the absence of metallic iron ore and nickel shows that it is not of meteoric origin; and the low percentage of lime would indicate that it is not slag from an iron furnace. As it approximates very closely to some of the recorded analyses of lava (especially lava from the Pacific Ocean islands and Iceland) it is in all probability of volcanic origin."

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for January, 1892, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 1.8 below the normal; maximum, 77, at Curtis, 5th; minimum, 10, at Mountain Home, 6th, and at Valley Head, 7th; greatest monthly range, 58, at Florence; least monthly range, 39, at Chepultepec.

Precipitation.—The average was 2.15 above the normal; greatest monthly, 12.55, at Mount Willing; least monthly, 2.70, at Tuscumbia.

Wind.—Prevailing direction, northwest.—*P. H. Mell, Observer, Weather Bureau, Auburn, director.*

ARIZONA.

Temperature.—The mean was about normal in the central and eastern parts of the territory, while in the western part it ranged about 3.0 above; maximum, 80, at Red Rock, 25th; minimum, -11, at Flagstaff, 13th; greatest monthly range, 73, at Flagstaff; least monthly range, 38, at Gila Bend.

Precipitation.—The precipitation was unusually heavy, averaging about 1.00 above the normal; greatest monthly, 7.00, at Flagstaff; least monthly, 0.30, at Teviston.

Wind.—Prevailing direction, southwest.—*J. C. Hayden, Observer, Weather Bureau, Tucson, director.*

ARKANSAS.

Temperature.—The mean was 1.1 below the normal; maximum, 74, at Hot Springs, 29th; minimum, -14, at Rogers, 19th; greatest monthly range, 80, at Rogers; least monthly range, 43, at Newport.

Precipitation.—The average was 1.62 below the normal; greatest monthly, 5.59, at Greenville, Miss.; least monthly, 0.55, at Paragould.

Wind.—Prevailing direction, north.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.*

COLORADO.

Temperature.—The mean was slightly above the normal; maximum, 71, at Lamar, 30th; minimum, -36, at Platoro, 13th; greatest monthly range, 94, at Julesburg; least monthly range, 54, at T. S. Ranch.

Precipitation.—The average was slightly above the normal, except in the central part; greatest monthly, 3.40, at Cambres; least monthly, 0.00, at Sanborn and East Dale.—*W. S. Miller, Observer, Weather Bureau, Denver, director.*

FLORIDA.

Temperature.—Maximum, 83, at Manatee, 11th; minimum, 22, at Archer and Fort Meade, 4th; greatest monthly range, 60, at Archer; least monthly range, 26, at Key West.

Precipitation.—Greatest monthly, 8.72, at Pensacola; least monthly, 0.29, at Hypoluxo.

Wind.—Prevailing direction, northwest.—*E. R. Demain, Observer, Weather Bureau, Jacksonville, director.*

GEORGIA.

Temperature.—Maximum, 76, at Quitman, 12th; minimum, 9, at Diamond, 7th; greatest monthly range, 55, at Millen; least monthly range, 32, at Elberton.

Precipitation.—Greatest monthly, 12.59, at Canton; least monthly, 2.49, at Savannah.

Wind.—Prevailing direction, northwest.—*Park Morrill, Local Forecast Official, Weather Bureau, Atlanta, director.*

ILLINOIS.

Temperature.—The mean was 3.7 below the normal of the last 17 years; maximum, 62, at Cairo and Golconda, 1st; minimum, -25, at Philo, 15th and 20th.

Precipitation.—The mean was 0.70 below the normal of the last 14 years; greatest monthly, 2.70, at Mascoutah; least monthly, 0.30, at New Haven.

Wind.—Prevailing direction, northwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*

INDIANA.

Temperature.—The mean was 2.7 below the normal; maximum, 62, at

Marengo, 29th; minimum, -22, at Marion, 20th; greatest monthly range, 78, at Marion; least monthly range, 55, at Michigan City.

Precipitation.—The average was 1.54 below the normal; greatest monthly, 2.43, at Vevay; least monthly, 0.69, at Shelbyville.

Wind.—Prevailing direction, southwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Local Forecast Official, Weather Bureau, assistant.*

IOWA WEATHER AND CROP SERVICE.

Temperature.—Maximum, 76, at Glenwood, 29th; minimum, -38, at Atlantic, 19th; greatest monthly range, 108, at Glenwood; least monthly range, 58, at Davenport.

Precipitation.—Greatest monthly, 3.13, at Fairfield; least monthly, 0.10, at Bancroft.

Wind.—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Local Forecast Official, Weather Bureau, assistant.*

KANSAS.

Temperature.—The mean was 1.1 above the normal; maximum, 81, at Shields, 26th; minimum, -34, at Seneca, 19th; greatest monthly range, 92, at Seneca; least monthly range, 69, at Altoona.

Precipitation.—The average was 0.27 below the normal; greatest monthly, 3.05, at Morse; least monthly, 0.02, at Shields.

Wind.—Prevailing direction, north.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Observer, Weather Bureau, assistant.*

KENTUCKY.

Temperature.—The mean was about 3.0 below the normal; maximum, 65, at Earlington, 29th; minimum, -6, at Pellville, 15th; greatest monthly range, 68, at Earlington; least monthly range, 46, at Richmond.

Precipitation.—The average was about 1.50 below the normal; greatest monthly, 6.46, at Middlesborough; least monthly, 0.92, at Earlington.

Wind.—Prevailing direction, southwest.—*Frank Burke, Observer, Weather Bureau, Louisville, director.*

LOUISIANA.

Temperature.—The mean was 4.8 below the normal; maximum, 79, at Abbeville, 29th, and at Cameron, 30th; minimum, 9, at Winnborough, 19th and 20th; greatest monthly range, 66, at Winnborough; least monthly range, 44, at Port Eads.

Precipitation.—The average was 0.43 above the normal; greatest monthly, 10.20, at Abbeville; least monthly, 0.51, at Delhi.

Wind.—Prevailing direction, north.—*George E. Hunt, Local Forecast Official, Weather Bureau, New Orleans, director.*

MARYLAND.

Temperature.—Maximum, 70, at Kirkwood, Del., 14th; minimum, 0, at Boettcherville; greatest monthly range, 63, at Charlotte Hall; least monthly range, 42, at New Market.

Precipitation.—Greatest monthly, 6.54, at Fallston; least monthly, 1.87, at Taneytown.

Wind.—Prevailing direction, northwest.—*Dr. William B. Clark, Johns Hopkins University, Baltimore, director; Prof. Milton Whitney, Maryland Agricultural College, secretary and treasurer; C. P. Cronk, Observer, Weather Bureau, in charge.*

MICHIGAN.

Temperature.—The mean was 4.0 below the normal of the last 16 years; maximum, 57, at Birch Run, 1st; minimum, -26, at Adrian, 20th; greatest monthly range, 80, at Adrian; least monthly range, 40, at Charlevoix.

Precipitation.—The average was 0.12 below the normal of the last 16 years; greatest monthly, 7.10, at Atlantic; least monthly, 0.44, at Hillsdale.

Wind.—Prevailing direction, southwest.—*E. A. Evans, Local Forecast Official, Weather Bureau, Detroit, director.*

MINNESOTA.

Temperature.—The mean was slightly above the normal, except in the north-eastern part; maximum, 54, at Mankato, 29th; minimum, -44, at Crookston, 18th; greatest monthly range, 87, at Leech Lake and Winibigoshish; least monthly range, 69, at Saint Paul and Sheldon.

Precipitation.—The average was considerably below the normal; greatest monthly, 0.82, at Kinbrae; least monthly, 0.02, at Saint Paul.

Wind.—Prevailing direction, northwest.—*J. H. Harmon, Observer, Weather Bureau, Minneapolis, director.*

MONTANA.

Temperature.—The mean was considerably above the normal; maximum, 61, at Choteau, 25th; minimum, —46, at Powder River, 18th.

Precipitation.—The average was 0.52 below the normal; greatest monthly, 2.25, at Choteau; least monthly, trace, at Dearborn Canyon.—*E. J. Glass, Observer, Weather Bureau, Helena, director.*

MISSISSIPPI.

Temperature.—The mean was 1.1 below the normal; maximum, 76, at Louisville, 4th; minimum, 7, at University, 7th; greatest monthly range, 67, at Louisville; least monthly range, 44, at Ship Island.

Precipitation.—The average was 0.73 above the normal; greatest monthly, 3.60, at Natchez.

Wind.—Prevailing direction, north.—*R. B. Fulton, Observer, Weather Bureau, University, director.*

MISSOURI.

Temperature.—The mean was 1.9 below the normal; maximum, 67, at Mine La Motte, 25th; minimum, —31, at Pickering, 19th; greatest monthly range, 85, at Mine La Motte; least monthly range, 55, at Hermann.

Precipitation.—The average was 0.04 below the normal; greatest monthly, 3.79, at Hermann; least monthly, 0.55, at Mine La Motte.

Wind.—Prevailing direction, northwest.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; J. H. Smith, Observer, Weather Bureau, assistant.*

NEBRASKA.

Temperature.—Maximum, 72, at Belvidere, 29th; minimum, —42, at Ansley, 19th; greatest monthly range, 106, at Ansley; least monthly range, 69, at Burwell.

Precipitation.—Greatest monthly, 2.16, at Pawlet; least monthly, 0.07, at York.

Wind.—Prevailing direction, northwest.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Observer, Weather Bureau, assistant.*

NEVADA.

Temperature.—The mean was about 2.0 above the normal; maximum, 73, at Tuscarora, 24th; minimum, —25, at Stofel, 26th, and at Pioche, 6th.

Precipitation.—The average was 0.95 below the normal; greatest monthly, 2.77, at Tuscarora; least monthly, 0.02, at Humboldt and Wabuska.

Wind.—Prevailing direction, south.—*Prof. Charles W. Friend, Carson City, director; F. A. Carpenter, Observer, Weather Bureau, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Temperature.—The mean was 2.0 above the normal; maximum, 64, at Plymouth (Mass.), 14th; minimum, —30, at Enosburgh Falls, 20th; greatest monthly range, 86, at West Milan; least monthly range, 48, at Portland.

Precipitation.—The average was 0.84 above the normal; greatest monthly, 7.01, at Lake Konomac; least monthly, 2.23, at Nantucket.

Wind.—Prevailing direction, northwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Observer, Weather Bureau, assistant.*

NEW JERSEY.

Temperature.—The mean was 0.3 above the normal; maximum, 64, at Mount Holly and Tenafly, 14th; minimum, —6, at Hanover, 17th; greatest monthly range, 65, at Dover and Hanover; least monthly range, 43, at Atlantic City.

Precipitation.—The average was 1.51 above the normal; greatest monthly, 7.05, at South Orange; least monthly, 2.50, at Newton.

Wind.—Prevailing direction, northwest.—*E. W. McGann, Observer, Weather Bureau, New Brunswick, director.*

NEW MEXICO.

Temperature.—Maximum, 76, at La Luz, 30th; minimum, —32, at Dulce, 12th; greatest monthly range, 91, at Halls Peak; least monthly range, 39, at Springer.

Precipitation.—Greatest monthly, 1.84, at Chama; least monthly, 0.30, at Springer.

Wind.—Prevailing direction, northwest.—*H. B. Hersey, Observer, Weather Bureau, Santa Fe, director.*

NEW YORK.

Temperature.—The mean was 1.2 below the normal; maximum, 67, at Poughkeepsie, 14th; minimum, —31, at Madison Barracks, 20th; greatest monthly range, 81, at Madison Barracks; least monthly range, 40, at Fort Columbus.

Precipitation.—The average was 1.03 above the normal; greatest monthly, 7.06, at Fort Schuyler; least monthly, 2.10, at Oswego.

Wind.—Prevailing direction, southwest.—*Prof. E. A. Fuertes, Dean of the College of Civil Engineering, Cornell University, Ithaca, director; R. M. Hardinge, Observer, Weather Bureau, assistant.*

NORTH CAROLINA.

There was more than the usual number of severe cold waves.

Temperature.—The mean was 3.4 below the normal; maximum, 42, at Nor-

folk, Va., 13th; minimum, 4, at Linville, 8th; greatest monthly range, 57, at Knoxville, Tenn.; least monthly range, 42, at Southport.

Precipitation.—The average was 1.32 above the normal; greatest monthly, 11.50, at Concord; least monthly, 1.89, at Linville.

Wind.—Prevailing direction, northwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Observer, Weather Bureau, assistant.*

NORTH DAKOTA.

Temperature.—The mean was 4.2 above the normal; maximum, 58, at Grafton, 29th; minimum, —52, at Willow City, 19th; greatest monthly range, 96, at Grafton, least monthly range, 74, at Napoleon.

Wind.—Prevailing direction, northwest.—*W. H. Fallon, Observer, Weather Bureau, Bismarck, director.*

OHIO.

Temperature.—The mean was 3.0 below the normal; maximum, 61, at Marietta, 1st; minimum, —25, at Wapakoneta and Montpelier, 20th; greatest monthly range, 79, at Weymouth and Garrettsville; least monthly range, 51, at Portsmouth.

Precipitation.—The average was 1.08 below the normal; greatest monthly, 5.07, at Ashland; least monthly, 0.85, at Jacksonborough.

Wind.—Prevailing direction, southwest.—*Prof. B. F. Thomas, Columbus, director; C. M. Strong, Observer, Weather Bureau, secretary and assistant.*

OKLAHOMA.

Temperature.—Maximum, 75, at Fort Supply, 28th, at Gate City, 29th, and at Purcell, 25th; minimum, —14, at Gate City, 19th; greatest monthly range, 89, at Gate City; least monthly range, 74, at Burnet.

Precipitation.—Greatest monthly, 0.93, at Oklahoma City; least monthly, trace, at Fort Supply.—*Louis Dorman, Observer, Weather Bureau, Oklahoma City, director.*

OREGON.

Temperature.—The mean was 2.4 above the normal; maximum, 63, at Bandon, 22d, at Toledo, 23d, and at Roseburgh, 25th; minimum, —11, at Beulah, 12th; greatest monthly range, 69, at Pendleton; least monthly range, 19, at Newport.

Precipitation.—The average was 2.84 below the normal; greatest monthly, 9.96, at Langlois; least monthly, 0.12, at Silver Lake.

Wind.—Prevailing direction, southwest.—*Hon. H. E. Hayes, Master State Grange, Portland, director; B. S. Pague, Observer, Weather Bureau, asst.*

PENNSYLVANIA.

Temperature.—The mean was about 0.5 below the normal; maximum, 66, at Drifton, 14th; minimum, —28, at Columbus, 10th; greatest monthly range, 77, at Saegerstown; least monthly range, 45, at Harrisburg.

Precipitation.—The average was 1.17 above the normal; greatest monthly, 8.46, at Girardville; least monthly, 2.08, at Altoona.

Wind.—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; H. L. Ball, Observer, Weather Bureau, assistant.*

SOUTH CAROLINA.

Temperature.—Maximum, 72, at Conway and Trial, 19th; minimum, 16, at Trial, 28th.

Precipitation.—Greatest monthly, 9.82, at Evergreen; least monthly, 2.94, at Port Royal.

Wind.—Prevailing direction, northwest.—*A. P. Butler, Observer, Weather Bureau, Columbia, director.*

SOUTH DAKOTA.

Temperature.—The mean was 0.3 above the normal; maximum, 69, at Rapid City, 30th; minimum, —40, at Sioux Falls, 19th; greatest monthly range, 94, at Rapid City; least monthly range, 74, at Aberdeen.

Precipitation.—The average was 0.09 below the normal; greatest monthly, 2.55, at Oelrichs; least monthly, 0.07, at Millbank.

Wind.—Prevailing direction, northwest.—*S. W. Glenn, Local Forecast Official, Weather Bureau, Huron, director.*

TENNESSEE WEATHER CROP SERVICE.

The month was the coldest since 1888.

Temperature.—The mean was 4.0 below the normal; maximum, 66, at Knoxville, 1st, at Lynnville, 2d, and at Chattanooga and Memphis, 25th; minimum, 4, at Northville, 4th; greatest monthly range, 60, at Bethel Springs; least monthly range, 36, at Andersonville.

Precipitation.—The average was 0.86 below the normal; greatest monthly, 8.72, at Parksville; least monthly, 0.98, at Waynesborough.—*J. B. Marbury, Local Forecast Official, Weather Bureau, Nashville, director.*

TEXAS.

Temperature.—The mean was below the normal; maximum, 89, at Nacogdoches, 31st; minimum, —10, at Silver Falls, 19th; greatest monthly range, 94, at Childress; least monthly range, 46, at Galveston.

Precipitation.—The average was 1.08 below the normal; greatest monthly, 3.93, at Palestine; least monthly, 0.10, at Roby.—*D. D. Bryan, Galveston, director; I. M. Cline, Local Forecast Official, Weather Bureau, assistant.*

UTAH.

Temperature.—Maximum, 68, at Saint George, 27th; minimum, —17, at Nephi, 11th; greatest monthly range, 64, at Cisco; least monthly range, 31, at Grouse Creek.

Precipitation.—Greatest monthly, 1.70, at Lake Park; least monthly, 0.13, at Thistle.—*G. N. Salisbury, Observer, Weather Bureau, Salt Lake City, director.*

VIRGINIA.

Temperature.—Maximum, 74, at Richmond, 14th; minimum, —2, at Lexington, 8th; greatest monthly range, 65, at Richmond; least monthly range, 48, at Bedford City and Blacksburg.

Precipitation.—Greatest monthly, 5.95, at Avon; least monthly, 2.99, at Blacksburg.

Wind.—Prevailing direction, northwest.—*Dr. E. A. Craighill, Lynchburg, director; J. N. Ryker, Observer, Weather Bureau, assistant.*

WASHINGTON.

Temperature.—The mean was 1.9 above the normal; maximum, 69, at Centerville, 1st; minimum, —9, at Waterville, 11th and 12th; greatest monthly range, 62, at Walla Walla; least monthly range, 23, at Aberdeen.

Precipitation.—The average was 1.82 below the normal; greatest monthly, 13.51, at Neah Bay; least monthly, 0.50, at Waterville.—*E. B. Olney, Observer, Weather Bureau, Olympia, director.*

WEST VIRGINIA.

Temperature.—Maximum, 76, at Morgantown, 1st; minimum, —3, at Tan-

nery, 10th; greatest monthly range, 74, at Morgantown; least monthly range, 43, at Piedmont.

Precipitation.—Greatest monthly, 4.91, at Parkersburg; least monthly, 1.67, at Romney.

Wind.—Prevailing direction, west.—*W. W. Dent, Observer, Weather Bureau, Parkersburg, director.*

WISCONSIN.

Temperature.—Maximum, 58, at Prairie du Chien, 25th; minimum, —45, at Haywards, 19th; greatest monthly range, 84, at Barron and Butternut; least monthly range, 51, at Beaver Dam.

Precipitation.—Greatest monthly, 3.38, at New Holstein; least monthly, 0.07, at Osceola Mills.

Wind.—Prevailing direction, northwest.—*W. L. Moore, Local Forecast Official, Weather Bureau, Milwaukee, director.*

WYOMING.

Temperature.—The mean was slightly below the normal; maximum, 72, at Casper, 24th; minimum, —44, at Fort Fetterman, 11th; greatest monthly range, 112, at Fort Fetterman; least monthly range, 70, at Evanston.

Precipitation.—The average was slightly above the normal; greatest monthly, 1.21, at Lusk; least monthly, 0.00, at Bitter Creek.

Wind.—Prevailing direction, west.—*E. M. Ravenscraft, Observer, Weather Bureau, Cheyenne, director.*

CONTRIBUTIONS AND ORIGINAL ARTICLES.

CHINOOK WINDS.

[By E. B. GARRIOTT, Weather Bureau.]

Winds of a peculiar type, characterized by unusual warmth and dryness, occur during the colder months in various parts of the globe. The *Chinooks* of the northwestern part of the United States, the *Föhn* of Switzerland, and the *Zonda* of the Argentine Republic belong to this type.

The *Chinooks* are warm, dry winds, often of considerable force, which sweep over districts east of the principal mountain ranges of the northwestern part of the United States. Their occurrence is confined to the colder months. They are felt as far south as the middle-eastern slope of the Rocky Mountains; but are more pronounced on the northeast slope, which embraces Montana and the southern Saskatchewan valley.

The *Chinooks* are storm winds, and belong to the wind system of regular cyclonic areas. From October to March, inclusive, a principal track of low pressure areas or general storms lies north of Washington, Idaho, and Montana. The passage of these storms is attended in districts to the southward by westerly winds whose strength is proportional to the energy of the cyclonic disturbance, whose force diminishes as the distance from the center of disturbance increases, and whose duration depends upon the velocity of the storm-center.

The winter temperatures in Montana are among the lowest noted in the United States. With the approach of a low pressure storm from the north Pacific coast, and preceding the appearance or development of such a storm in extreme western British America, high pressure and low temperature obtain over the northeast slope of the Rocky Mountains, and a high pressure area usually occupies the middle plateau region. As the low area approaches or extends its influence rain will set in on the north Pacific coast; the temperature will be 40° to 50° in that district; and a temperature gradient or difference of 40°, or more, will be shown between the regions to the east and west of the Rocky Mountains. In low areas of pronounced strength the cyclonic indraught causes westerly winds from the mountains over Montana and southern Alberta; the cold air to the leeward of the mountains is withdrawn by the general movement of the lower atmosphere, and is replaced by air from the windward side. Following the march of the mass of warm, moist air from west of the Rocky Mountains we find that it reaches the windward side with temperature 40°, or more, higher than the temperature of the air to the leeward. Forced to the summit it loses heat by expansion and moisture by condensation of aqueous vapor by the cold of elevation, the latter operation being attended by the liberation of more or less latent heat, which has the effect of modifying to some extent the chilling process. In descending the leeward side to replace the air removed by the westerly winds it acquires heat by compression. If the loss of heat by expansion in the ascent is compensated by the gain by compression in the descent, the air forced over the mountains assumes practically the same temperature it had before the ascent was commenced, and is 40°, or more, warmer than the air it replaced.

These warm, and in the case above mentioned dried, winds sweep eastward with the advance of the storm-center. Their eastward limit depends upon the movement and character of the general storm, and also upon the condition of the ground over which they pass as regards dryness and moisture. If the

ground is covered with snow much heat is lost in the process of evaporation. The snow is melted by the warmth, and the liberated moisture is absorbed by the dry air. In such cases the air is gradually chilled, and the temperature rise is less marked as the distance traveled by the crest of the warm wave increases.

A remarkable feature of the *Chinooks* is the marked temperature rise which attends their arrival. Thermograph record sheets show an almost vertical line of ascent covering 40° to 50°, and reports indicate that an increase of 70° to 80° in six to eight hours is not uncommon.

The *Chinooks* occur under well-defined meteorological conditions, and a forecast of their approach is not more difficult than a prediction of warmer weather for the eastern part of the country.

When conditions are favorable the warm winds of the Northwest are supplemented by warm air drawn by the cyclonic indraught from southern latitudes of the central valleys. The *Chinook* contingent is re-enforced, and the warm condition or warm wave accompanies the low pressure area in its advance to the Atlantic coast.

Warm, dry winds are not uncommon on the middle-eastern slope of the Rocky Mountains. The cyclonic system of winds is also the cause of their origin in that region. The temperature conditions preceding their occurrence are somewhat similar to those observed in connection with the *Chinooks* of the Northwest. A body of cold air occupies the districts on the leeward side of the mountains, and the air to the windward shows comparatively higher temperature. The air from the elevated plateau is forced over the mountains and gains heat by compression during the descent on the leeward side.

In the warmer months conditions for the development of the *Chinooks*, as warm winds, rarely exist. Cyclonic areas seldom pass from the north Pacific Ocean over the Saskatchewan Valley during that season. In summer the northeast slope of the Rocky Mountains is one of the warmest and the north Pacific coast is one of the coolest districts in the United States. With the passage of a storm-center north of the *Chinook* region the wind would blow, not from a warm to a cold region, but from a cool to a much warmer region. To the leeward of the mountains it would be a cooler rather than a warmer wind.

Following a period of intense cold the *Chinook* wind is a welcome visitor in the Northwest. The icy clutch of winter is loosened. The earth throws off its winding-sheet of snow. Humanity ventures forth to inhale the balmy, spring-like air. Animate nature rejoices.

A notable *Chinook* wind was experienced in the Northwest January 19, 1892. A graphic illustration of the temperature change due to this wind is shown by a copy of a section of the thermograph record sheet at Fort Assinaboine, Mont., which appears in a description of low area VIII in this Review. This record shows a temperature rise of about 43° in fifteen minutes, and a rise of about 49° in less than three hours. Chart VII with this number of the Review shows the general meteorological conditions west of the 95th meridian at the 8 p. m. report of January 18th, which preceded, and at the 8 a. m. report of January 19th, which followed, the arrival of the *Chinook* at Fort Assinaboine. Under low area VIII a description of these charts is included in a general description of the meteorological conditions which obtained in the Northwest during January 18 and 19, 1892.